

RECLAMATION

Managing Water in the West

The Colorado River: Operation and Current Conditions

October 25, 2007



U.S. Department of the Interior
Bureau of Reclamation

The Colorado River Operation and Current Conditions

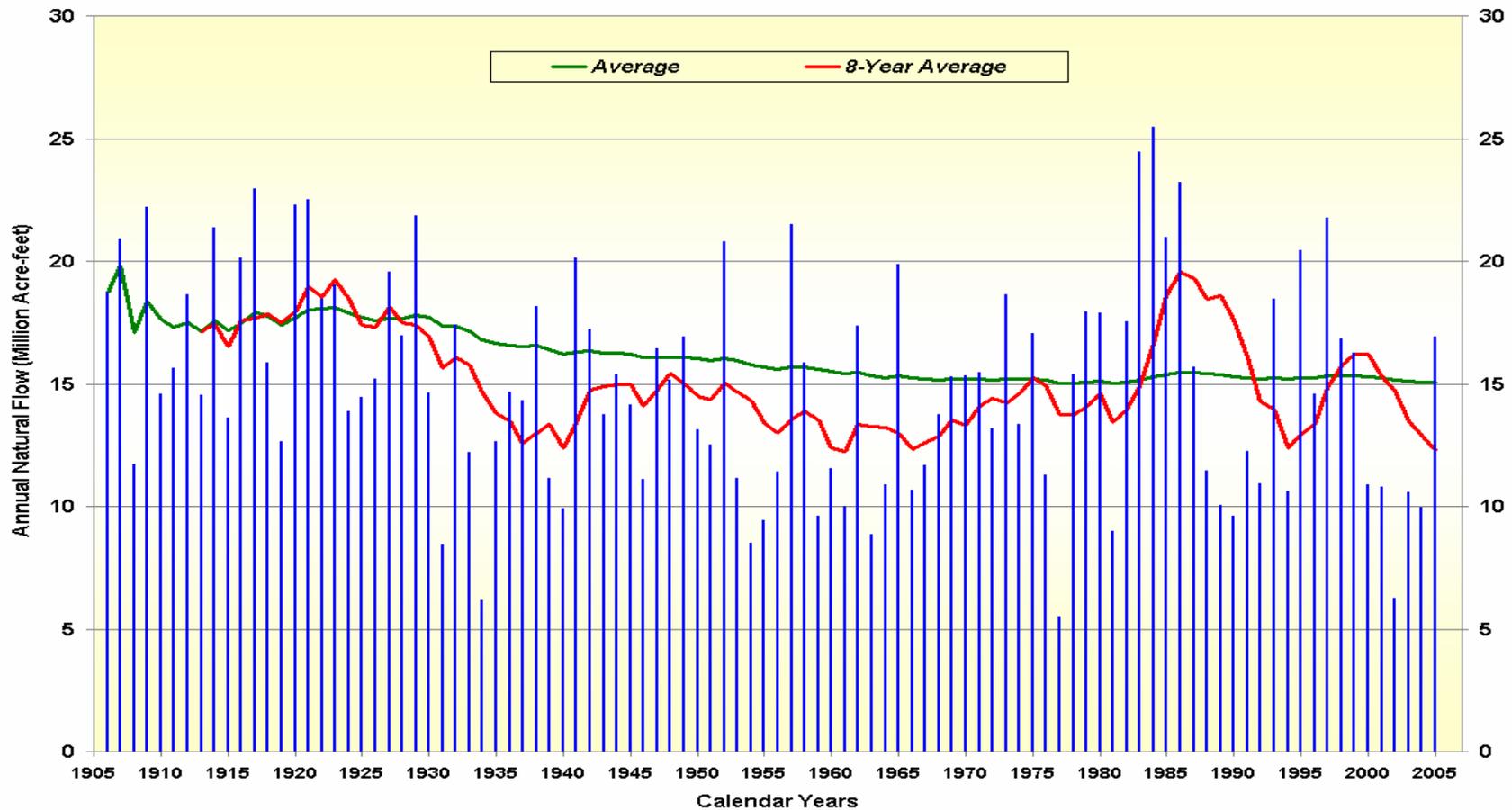
- Overview of the Basin
- Operation of the Lakes Powell and Mead
- System Status
- Need for Additional Operational Guidelines

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Natural Flow

Colorado River at Lees Ferry Gaging Station, Arizona

Calendar Year 1906 to 2005



Provisional data, subject to change

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Operation of Lake Powell

- Three modes of governing annual releases from Lake Powell
 - Minimum objective release – 8.23 maf
 - Equalization (if Powell storage > Mead and the 602(a) storage criteria is met)
 - Spill avoidance
- For 2007, minimum objective release will govern the operation

Operation of Lake Mead

- Two modes of governing annual releases from Lake Mead
 - Flood control operations
 - Meet downstream requirements (or demands)
- For 2007, meeting downstream demands will govern the operation

Operation of Lake Mead Downstream Requirements

- Downstream demands include:
 - California 4.4 maf
 - Arizona 2.8 maf
 - Nevada 0.3 maf
 - Mexico 1.5 maf
 - Regulation of Lakes Mohave and Havasu
 - System gains and losses
- Deliveries can be larger or smaller pursuant to the Consolidated Decree in *Arizona v. California*

Water Budget at Lake Mead

- Given current demands in the Lower Basin (including Mexico), and minimum objective release from Lake Powell, Lake Mead storage will continue to decline

▪ Inflow (release from Powell + side inflows)	= 9.0 maf
▪ Outflow (LB and Mexico apportionments + downstream regulation, gains and losses)	= - 9.5 maf
▪ Mead evaporation loss	= - 0.8 maf
▪ Balance	= - 1.3 maf

Colorado River Basin Storage

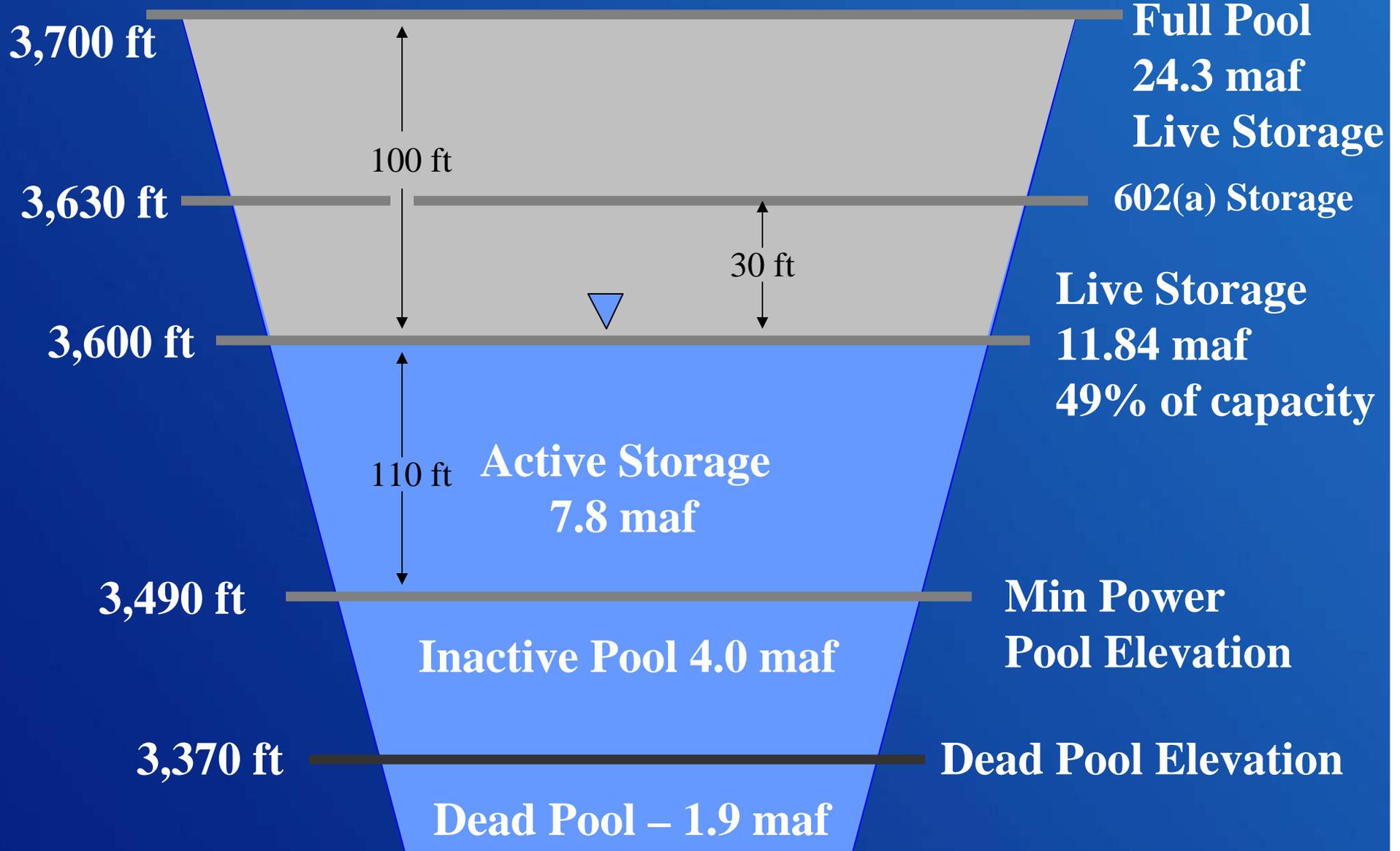
(as of Oct 24, 2007)

Current Storage	Percent Full	MAF	Elevation (Feet)
Lake Powell	49%	11.84	3600
Lake Mead	48%	12.50	1111
Total System Storage	54%*	31.90	NA

*Total system storage was 34.16 maf or 58% this time last year

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Lake Powell Capacity

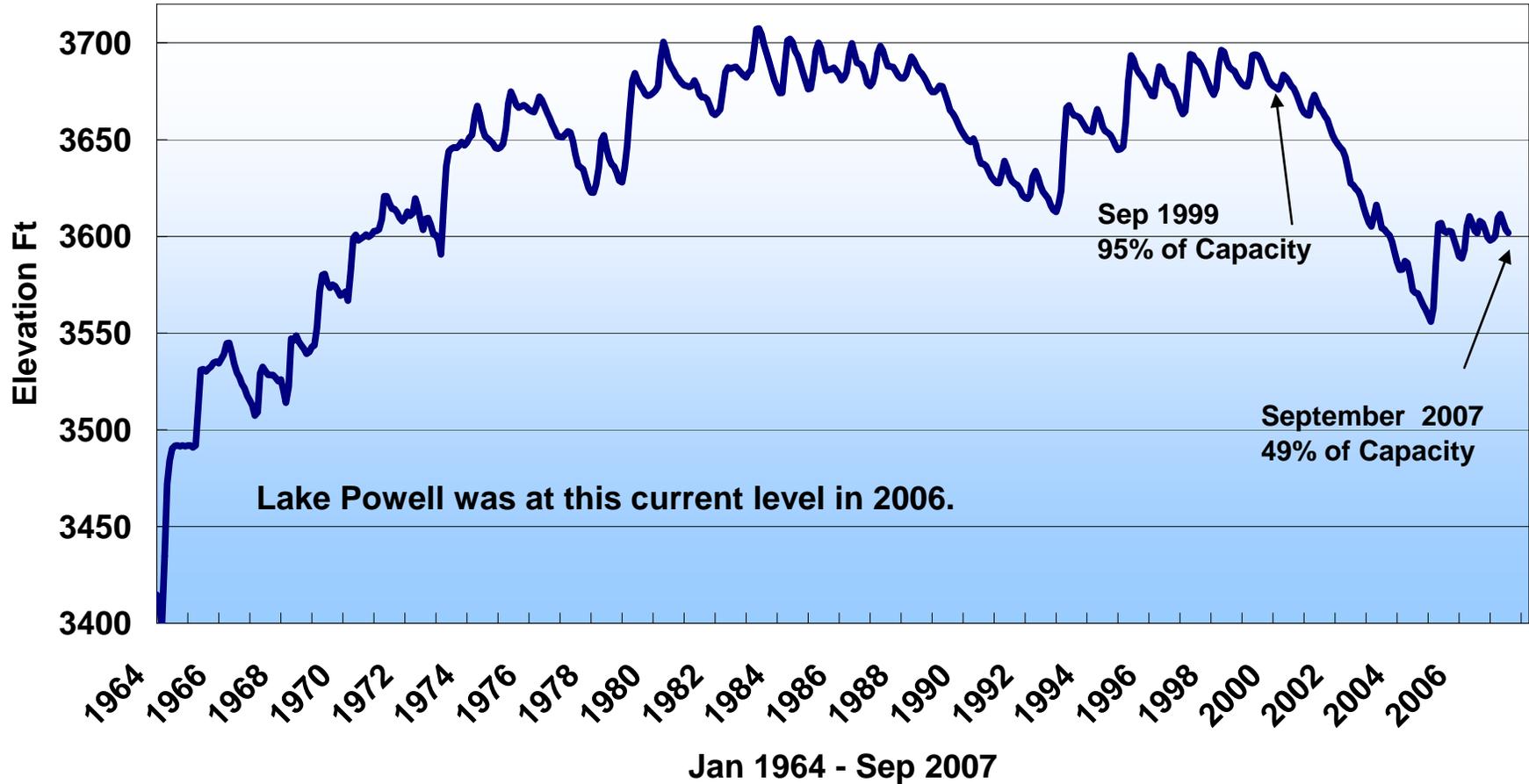


Not to scale

As of Oct 24, 2007

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Lake Powell End of Month Elevation 1964 through Present

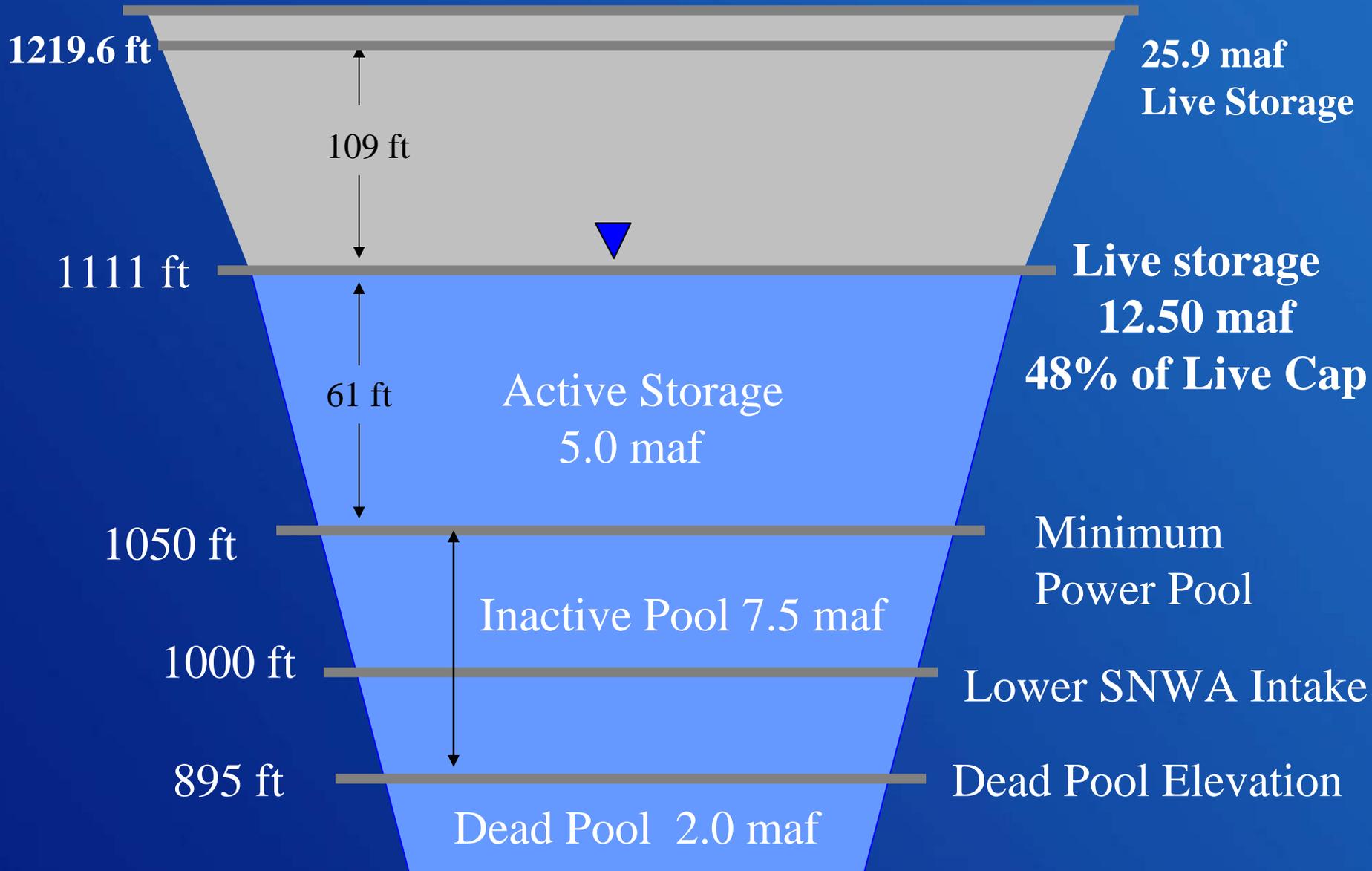


Lake Powell at Hite Bay 1999 – 2005



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Lake Mead Capacity

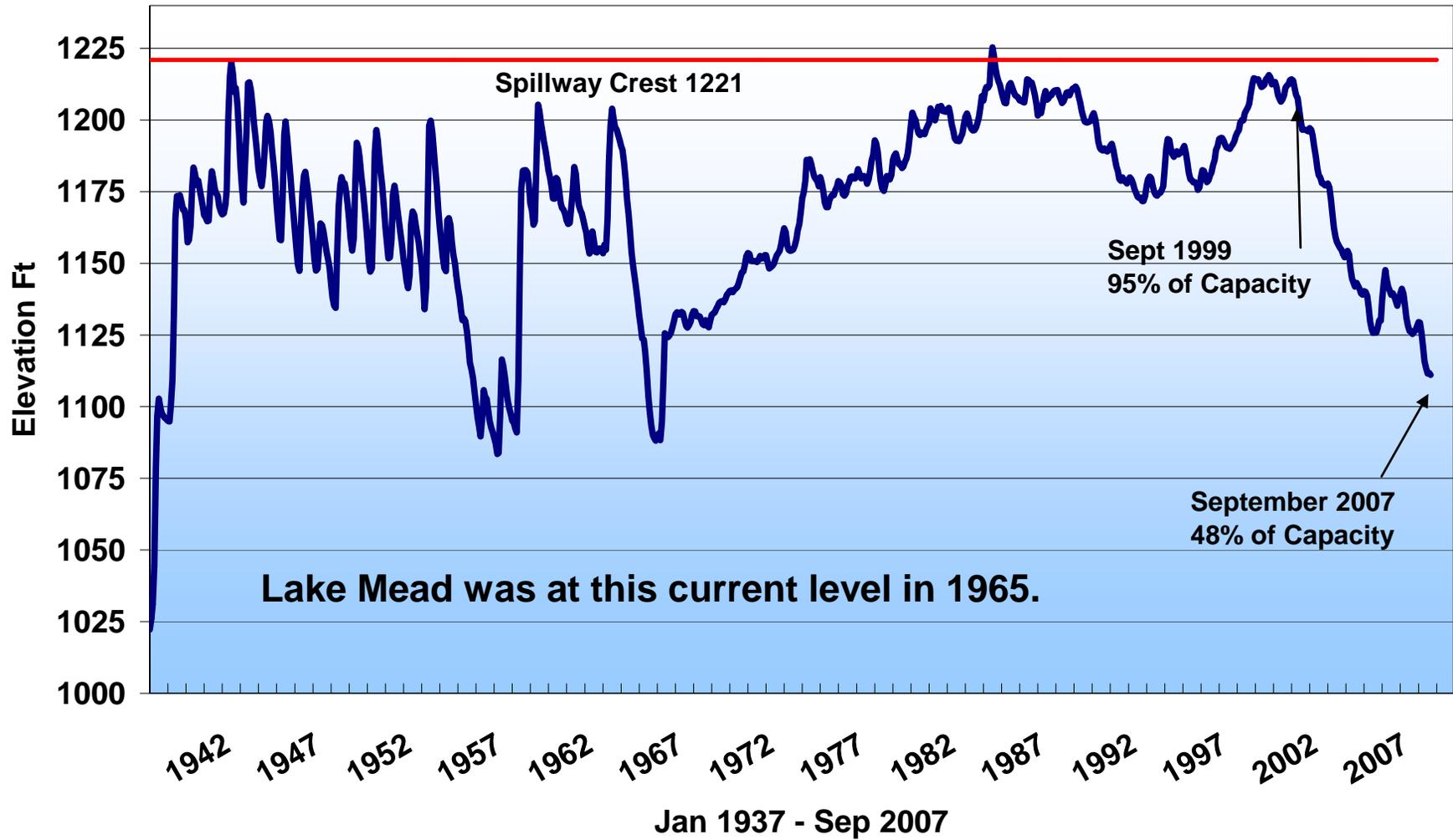


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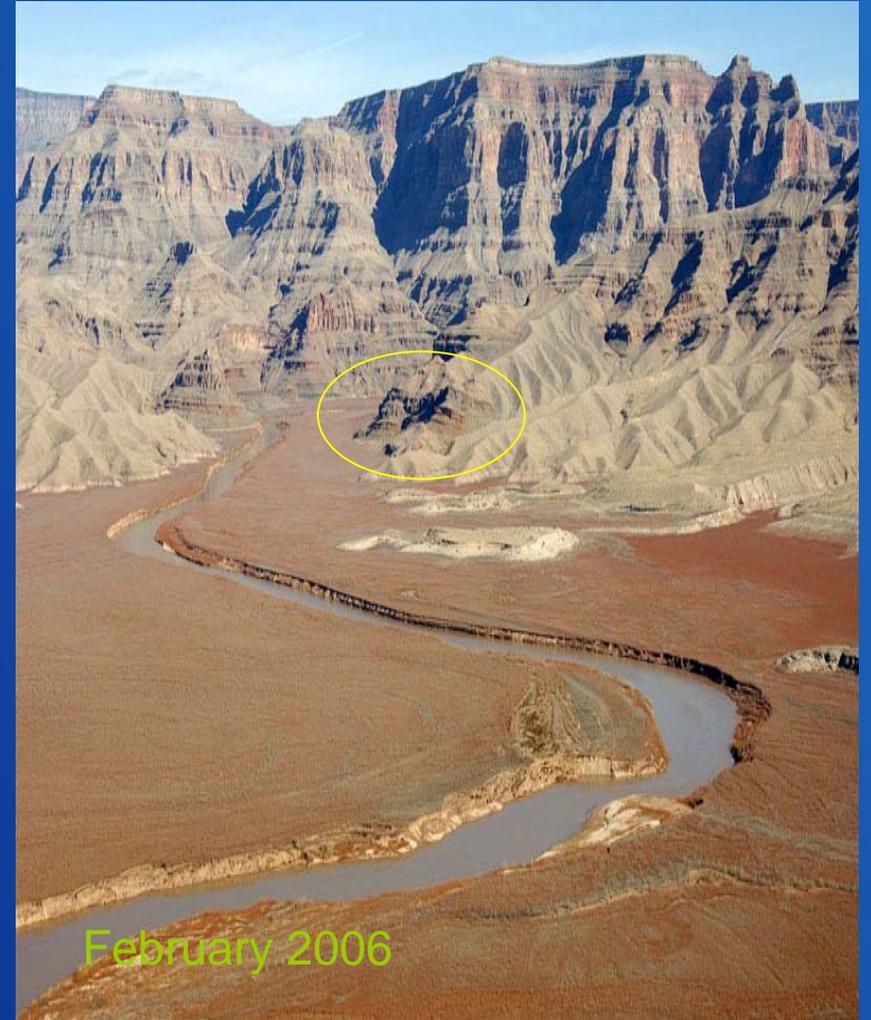
As of Oct 24, 2007

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Lake Mead End of Month Elevation



Lake Mead's Delta Area 1999 – 2006



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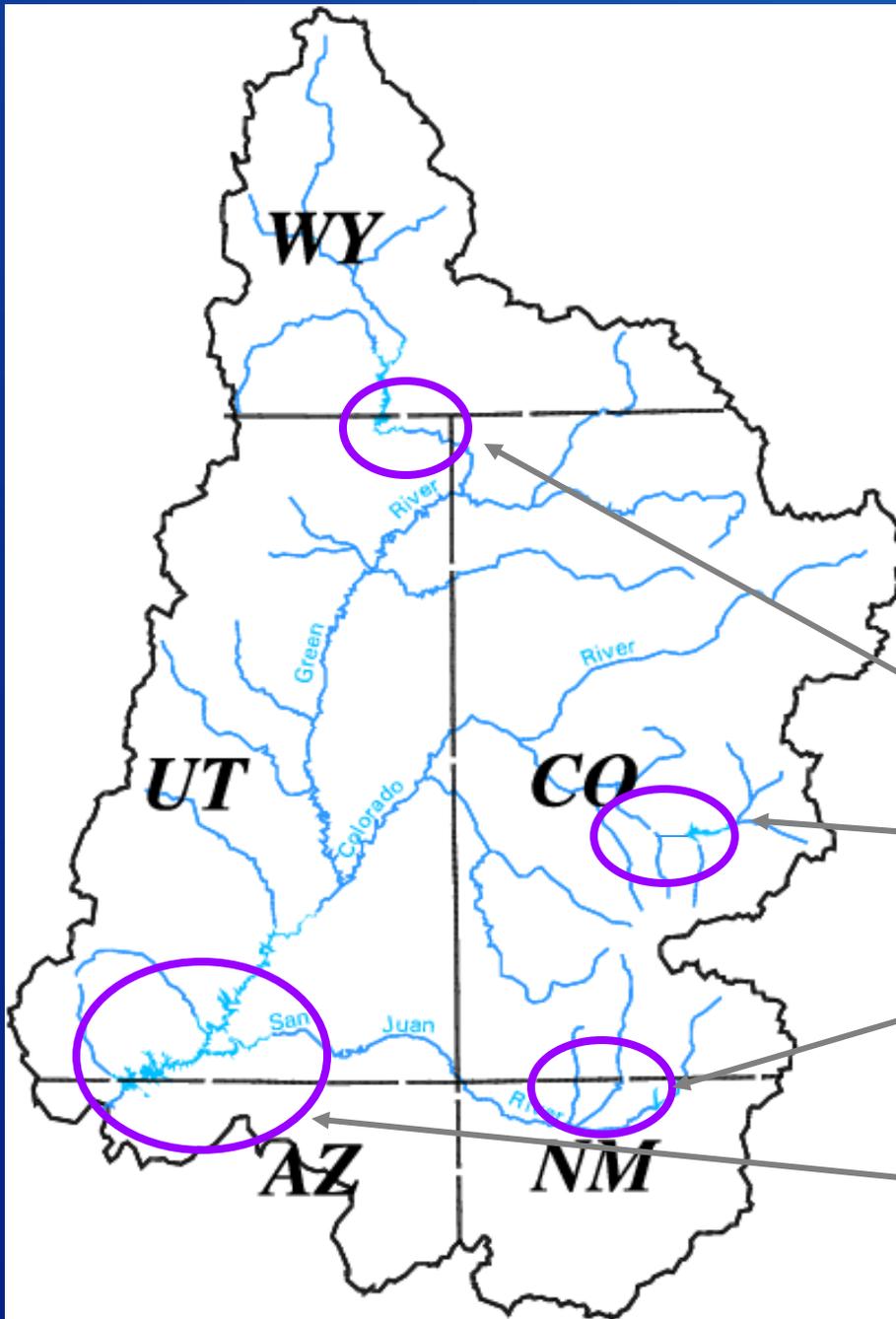
State of the System (1999-2007)

WY	Unregulated inflow into Powell % of Average	Powell and Mead Storage, maf	Powell and Mead % Capacity
1999	109	47.59	95
2000	62	43.38	86
2001	59	39.01	78
2002	25	31.56	63
2003	52	27.73	55
2004	51	23.11	46
2005	105	27.24	54
2006	73	25.80	51
2007	68	24.43	49

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Drought Conditions

- 2000-2007 was the driest 8-year period in the 100-year historical record
- Not unusual to have a few years of above average inflow during longer-term droughts (e.g., the 1950's)
- Final, Unregulated 2007 April through July runoff 51% of average



2007 Upper Colorado Final Unregulated Apr–Jul Inflow

Flaming Gorge – 31%

Blue Mesa – 71 %

Navajo – 74 %

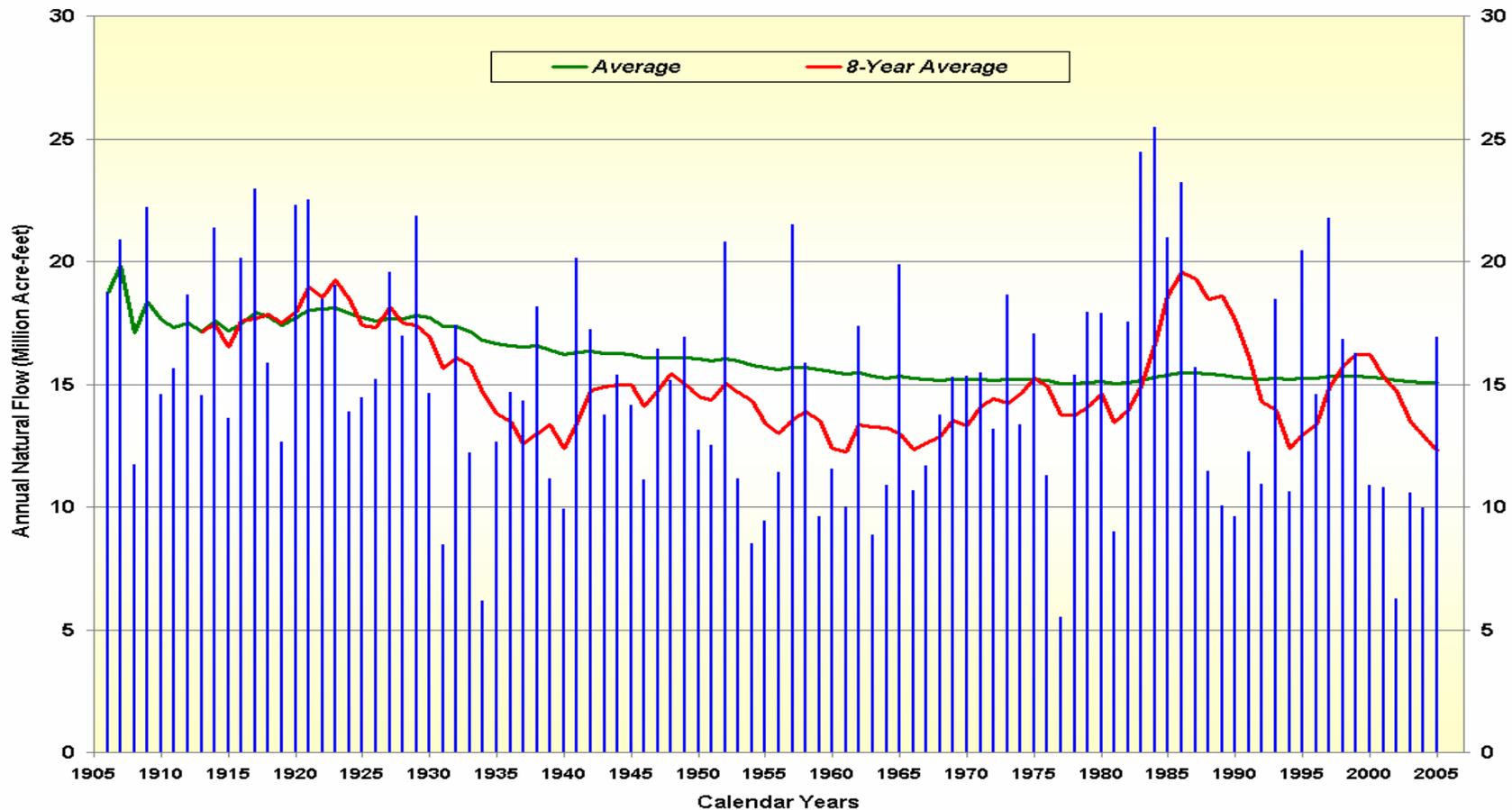
Lake Powell – 51 %

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Need for Additional Guidelines

Lake Mead Delta - 1999



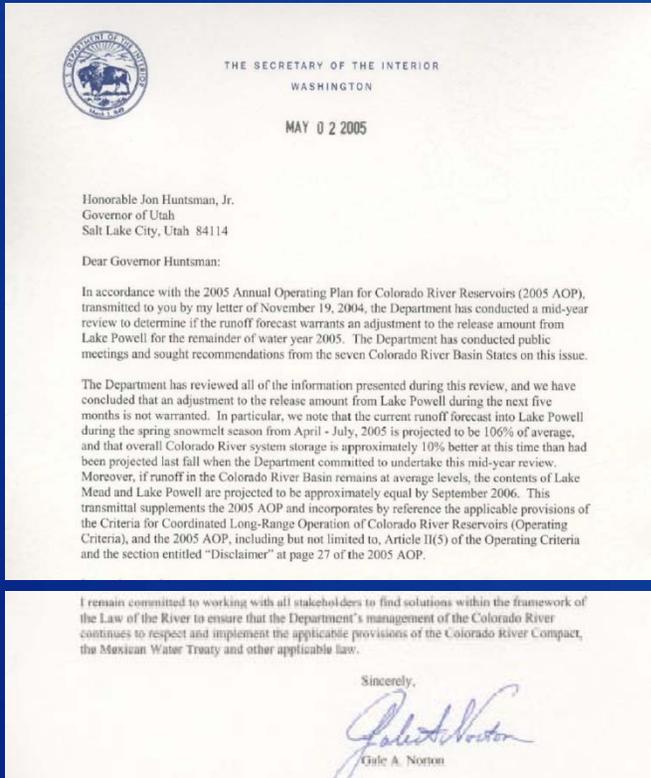
Lake Mead Delta - 2006



- Eight years of unprecedented drought
- Increased water use
- Increased tension among the Basin States
- To date, there has never been a shortage in the Lower Basin and there are currently no shortage guidelines
- Operations between Lake Powell and Lake Mead are currently coordinated only at the higher reservoir levels (“equalization”)

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Secretary's Decision May 2005



- Did not adjust Lake Powell's release for WY 2005
- Affirmed authority to adjust Lake Powell releases
- Tasked states to come up with a consensus plan
- Directed that guidelines be completed by December 2007
- NEPA process begun in September, 2005

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Key Considerations

(Identified through Scoping Process)

- Importance of encouraging conservation of water
- Importance of considering reservoir operations at all operational levels
- Guidelines for an interim period (assumed to be 2008 through 2026)

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Elements of Proposed Federal Action

- Shortage strategy for Lake Mead and the Lower Division states
- Coordinated operation of Lakes Powell and Mead
- Mechanism for the storage and delivery of conserved system and non-system water in Lake Mead
- Modification/extension of the existing Interim Surplus Guidelines

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Alternatives Analyzed

- Alternatives
 - No Action Alternative
 - Basin States Alternative
 - Conservation Before Shortage Alternative
 - Water Supply Alternative
 - Reservoir Storage Alternative
 - Preferred Alternative
 - Informed by public comments made on the Draft EIS
 - Composed of the operational elements identified and analyzed in the Draft EIS

Project website:
<http://www.usbr.gov/lc/region/programs/strategies.html>

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Preferred Alternative

- Key Elements
 - A shortage strategy tied to Lake Mead elevations
 - 333, 417, 500 kaf at elevations 1075, 1050, and 1025 feet
 - Initiate efforts to develop additional guidelines for shortages if Lake Mead falls below elevation 1,025 (Includes re-consultation)
 - Release from Lake Powell determined by storage of Powell and Mead
 - Under high reservoir conditions, minimum objective release of 8.23 maf from Lake Powell unless storage equalization releases are required
 - Under lower reservoir conditions, either reduce Lake Powell release or balance volumes depending upon elevations at Lake Powell and Lake Mead

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Preferred Alternative (continued)

- Key Elements (continued)
 - Storage and delivery of conserved system and non-system water through Intentionally Created Surplus (ICS)
 - Maximum total ICS credits of 2.1 maf (analyzed a maximum quantity of up to 4.2 maf)
 - System assessment of 5% when ICS is created
 - ISG modified to eliminate Partial Domestic Surplus condition and extended through 2026

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Operational Diagrams for Lakes Powell and Mead under the Preferred Alternative

Lake Powell

Lake Powell Elevation (feet msl)	Preferred Alternative	Lake Powell Storage (maf)
3,700	Equalize, Avoid Spills or Release 8.23 maf	24.3
Equalization	Upper Equalization Line	Equalization
	Release 8.23 maf; if Lake Mead < 1,075 feet msl, balance contents with a min/max release of 7.0 and 9.0 maf	
3,595		11.3
3,575		9.5
3,560	Release 7.48 maf; if Lake Mead < 1,025 feet msl, release 8.23 maf	8.3
		5.9
3,525		5.9
3,490	Balance contents with a min/max release of 7.0 and 9.5 maf	4.0
		0
3,370		0

Lake Mead

Lake Mead Elevation (feet msl)	Preferred Alternative	Lake Mead Storage (maf)
1,220	Flood Control or 70R Surplus	25.9
1,200		22.9
	Domestic Surplus	
1,145		15.9
	Normal Operations	
1,125		13.9
1,100		11.5
1,075		9.4
	Shortage 333 kaf ¹	
1,050		7.5
	Shortage 417kaf ¹	
1,025		5.8
	Shortage 500 kaf ¹ and Reconsultation ²	
1,000		4.3
895		0

¹ These are amounts of shortage (i.e., reduced deliveries in the United States). The Final EIS will include modeling assumptions that identify water deliveries to Mexico pursuant to the 1944 Water Treaty.

² If Lake Mead falls below elevation 1,025 ft msl, the Department will initiate efforts to develop additional guidelines for shortages at lower Lake Mead elevations. (Note: includes re-consultation with Basin States)

Project Schedule

- ✓ Summer 2005
 - Solicited public comments on proposed content, format, mechanisms and analysis
- ✓ Fall 2005
 - Announced intent to initiate NEPA process, solicited public comments on scope and alternatives development
- ✓ March 2006
 - Published Scoping Summary Report
- ✓ June 2006
 - Published the proposed alternatives
- ✓ February 2007
 - Published Draft EIS
- ✓ March through April 2007
 - Public comment period

- November 2, 2007 Target publication date for Final EIS
- Nov 2 – Dec 3, 2007 Target 30-day review period
- December 2007 Record of Decision

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An aerial photograph of a large concrete dam and reservoir. The reservoir is filled with clear blue water and is surrounded by rugged, brown mountains. The dam is a curved concrete structure with several spillways. A road with cars is visible on the dam's crest. The sky is clear and blue.

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For further information:
<http://www.usbr.gov/lc/region>

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